

## Career Academy Integrated Unit Plan

Academy Name: Engineering

School: New Smyrna Beach High School

<b>Integrated Unit Plan Title:</b> CTE Related, High Interest FCAT Reading Practice Passages
<b>Courses to integrate:</b> English and CTE courses level 1, 2, and 3
<b>Grade Level:</b> 9 <sup>th</sup> , 10 <sup>th</sup> and 11 <sup>th</sup>
<b>Timeline &amp; Duration:</b> 18 weeks

**Unit Summary:** Every Tuesday, students in English I, English I Honors, English II, English II Honors, English III and English III Honors, students will be given an article between 800-1200 words that has been selected by the CTE teachers. Students will practice the LLCCC Reading Strategy as they read the articles in English class or for homework. Then, students are to take their articles to their English and CTE classes for brief discussions on Wednesdays. This will expose them to high level reading material that is directly tied to their career interests. As they compare and contrast the different articles throughout the year, they will increase their research and reference skills, reading fluency and comprehension. The unit will serve as an encouragement to predominately resistant readers, and an area of enrichment for even the strongest readers.

Course	English	Engineering	Construction	Gaming
Activity/Lesson	Introduce the LLCCC reading strategy process. Reinforce the process through practical whole class practices.	Encourage students to use LLCCC when reading their textbooks, or other printed materials for class.	Encourage students to use LLCCC when reading their textbooks, or other printed materials for class.	Encourage students to use LLCCC when reading their textbooks, or other printed materials for class.
Activity/Lesson	Distribute the LLCCC/CTE practice articles to students each Tuesday.	Entice students to read the assigned article using probing questions.	Entice students to read the assigned article using probing questions.	Entice students to read the assigned article using probing questions.

Activity/Lesson	Follow up on Wednesdays by facilitating small or large group discussions about the weekly article.	Follow up on Wednesdays by facilitating small or large group discussions about the weekly article.	Follow up on Wednesdays by facilitating small or large group discussions about the weekly article.	Follow up on Wednesdays by facilitating small or large group discussions about the weekly article.
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**See LLCCC master folder for articles and reading schedule.**

## Construction Article #1

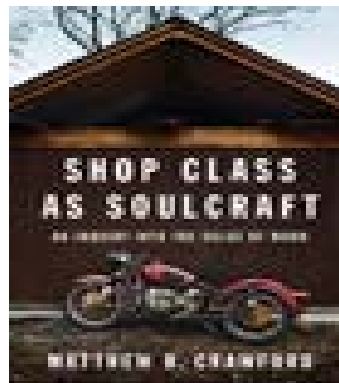
Use the LLCCC process on the following article.

Then, bring the article to English and Construction.

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Editor's Note:** The original essay below, by *New Atlantis* contributing editor [Matthew B. Crawford](#), was published in 2006. Mr. Crawford has expanded the essay into a book — *Shop Class as Soulcraft: An Inquiry into the Value of Work* — just published in May 2009 by Penguin. An excerpt from the book was published in the *New York Times Magazine* as “[The Case for Working with Your Hands.](#)”



## Shop Class as Soulcraft

[Matthew B. Crawford](#)

**A**n anyone in the market for a good used machine tool should talk to Noel Dempsey, a dealer in Richmond, Virginia. Noel's bustling warehouse is full of metal lathes, milling machines, and table saws, and it turns out that most of it is from schools. EBay is awash in

such equipment, also from schools. It appears shop class is becoming a thing of the past, as educators prepare students to become “knowledge workers.”

At the same time, an engineering culture has developed in recent years in which the object is to “hide the works,” rendering the artifacts we use unintelligible to direct inspection. Lift the hood on some cars now (especially German ones), and the engine appears a bit like the shimmering, featureless obelisk that so enthralled the cavemen in the opening scene of the movie *2001: A Space Odyssey*. Essentially, there is another hood under the hood. This creeping concealedness takes various forms. The fasteners holding small appliances together now often require esoteric screwdrivers not commonly available, apparently to prevent the curious or the angry from interrogating the innards. By way of contrast, older readers will recall that until recent decades, Sears catalogues included blown-up parts diagrams and conceptual schematics for all appliances and many other mechanical goods. It was simply taken for granted that such information would be demanded by the consumer.

A decline in tool use would seem to betoken a shift in our mode of inhabiting the world: more passive and more dependent. And indeed, there are fewer occasions for the kind of spiritedness that is called forth when we take things in hand for ourselves, whether to fix them or to make them. What ordinary people once made, they buy; and what they once fixed for themselves, they replace entirely or hire an expert to repair, whose expert fix often involves installing a pre-made replacement part.

So perhaps the time is ripe for reconsideration of an ideal that has fallen out of favor: manual competence, and the stance it entails toward the built, material world. Neither as workers nor as consumers are we much called upon to exercise such competence, most of us anyway, and merely to recommend its cultivation is to risk the scorn of those who take themselves to be the most hard-headed: the hard-headed economist will point out the opportunity costs of making what can be bought, and the hard-headed educator will say that it is irresponsible to educate the young for the trades, which are somehow identified as the jobs of the past. But we might pause to consider just how hard-headed these presumptions are, and whether they don't, on the contrary, issue from a peculiar sort of idealism, one that insistently steers young people toward the most ghostly kinds of work.

Judging from my admittedly cursory survey, articles began to appear in vocational education journals around 1985 with titles such as “The Soaring Technology Revolution” and “Preparing Kids for High-Tech and the Global Future.” Of course, there is nothing new about American future-ism. What is new is the wedding of future-ism to what might be called “virtualism”: a vision of the future in which we

somehow take leave of material reality and glide about in a pure information economy. New and yet not so new—for fifty years now we've been assured that we are headed for a "post-industrial economy." While manufacturing jobs have certainly left our shores to a disturbing degree, the manual trades have not. If you need a deck built, or your car fixed, the Chinese are of no help. Because they are in China. And in fact there are reported labor shortages in both construction and auto repair. Yet the trades and manufacturing are lumped together in the mind of the pundit class as "blue collar," and their requiem is intoned. Even so, the *Wall Street Journal* recently wondered whether "skilled [manual] labor is becoming one of the few sure paths to a good living." This possibility was brought to light for many by the bestseller *The Millionaire Next Door*, which revealed that the typical millionaire is the guy driving a pickup, with his own business in the trades. My real concern here is not with the economics of skilled manual work, but rather with its intrinsic satisfactions. I mention these economic rumors only to raise a suspicion against the widespread prejudice that such work is somehow not viable as a livelihood. (735 words)

## Construction Article #2

Use the LLCCC process on the following article.

Then, bring the article to English and Construction.

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

### The Psychic Appeal of Manual Work

I began working as an electrician's helper at age fourteen, and started a small electrical contracting business after college, in Santa Barbara. In those years I never ceased to take pleasure in the moment, at the end of a job, when I would flip the switch. "And there was light." It was an experience of agency and competence. The effects of my work were visible for all to see, so my competence was real for others as well; it had a social currency. The well-founded pride of the tradesman is far from the gratuitous "self-esteem" that educators would impart to students, as though by magic.

I was sometimes quieted at the sight of a gang of conduit entering a large panel in a commercial setting, bent into nestled, flowing curves, with varying offsets, that somehow all terminated in the same plane. This was a skill so far beyond my abilities that I felt I was in the presence of some genius, and the man who bent that conduit surely imagined this moment of recognition as he worked. As a residential electrician, most of my work got covered up inside walls. Yet even so, there is pride in meeting the aesthetic demands of a workmanlike installation. Maybe another electrician will see it someday. Even if not, one feels responsible to one's better self. Or rather, to the thing itself—craftsmanship might be defined simply as the desire to do something well, for its own sake. If the primary satisfaction is intrinsic and private in this way, there is nonetheless a sort of self-disclosing that takes place. As Alexandre Kojève writes:

The man who works recognizes his own product in the World that has actually been transformed by his work: he recognizes himself in it, he sees in it his own human reality, in it he discovers and reveals to others the objective reality of his humanity, of the originally abstract and purely subjective idea he has of himself.

The satisfactions of manifesting oneself concretely in the world through manual competence have been known to make a man quiet and easy. They seem to relieve him of the felt need to offer chattering *interpretations* of himself to vindicate his worth. He can simply point: the building stands, the car now runs, the lights are on. Boasting is what a boy does, who has no real effect in the world. But craftsmanship must reckon with the infallible judgment of reality, where one's failures or shortcomings cannot be interpreted away.

Hobbyists will tell you that making one's own furniture is hard to justify economically. And yet they persist. Shared memories attach to the material souvenirs of our lives, and producing them is a kind of communion, with others and with the future. Finding myself at loose ends one summer in Berkeley, I built a mahogany coffee table on which I spared no expense of effort. At that time I had no immediate prospect of becoming a father, yet I imagined a child who would form indelible impressions of this table and know that it was his father's work. I imagined the table fading into the background of a future life, the defects in its execution as well as inevitable stains and scars becoming a surface textured enough that memory and sentiment might cling to it, in unnoticed accretions. More fundamentally, the durable objects of use produced by men "give rise to the familiarity of the world, its customs and habits of intercourse between men and things as well as between men and men," as Hannah Arendt says. "The reality and reliability of the human world rest primarily on the fact that we are surrounded by things more permanent than the activity by which they were produced, and potentially even more permanent than the lives of their authors."

Because craftsmanship refers to objective standards that do not issue from the self and its desires, it poses a challenge to the ethic of consumerism, as the sociologist Richard Sennett has recently argued. The craftsman is proud of what he has made, and cherishes it, while the consumer discards things that are perfectly serviceable in his restless pursuit of the new. The craftsman is then more possessive, more tied to what is present, the dead incarnation of past labor; the consumer is more free, more imaginative, and so more valorous according to those who would sell us things. Being able to think materially about material goods, hence critically, gives one some independence from the manipulations of marketing, which typically divert attention from *what a thing is* to a back-story intimated through associations, the point of which is to exaggerate minor differences between brands. Knowing the production narrative, or at least being able to plausibly imagine it, renders the social narrative of the advertisement less potent. The tradesman has an impoverished fantasy life compared to the ideal consumer; he is more utilitarian and less given to soaring hopes. But he is also more autonomous.

This would seem to be significant for any political typology. Political theorists from Aristotle to Thomas Jefferson have questioned the republican virtue of the mechanic, finding him too narrow in his concerns to be moved by the public good. Yet this assessment was made before the full flowering of mass communication and mass conformity, which pose a different set of problems for the republican character: enervation of judgment and erosion of the independent spirit. Since the standards of craftsmanship issue from the logic of things rather than the art of persuasion, practiced submission to them perhaps gives the craftsman some psychic ground to stand on against fantastic hopes aroused by demagogues, whether commercial or political. The craftsman's habitual deference is not toward the

New, but toward the distinction between the Right Way and the Wrong Way. However narrow in its application, this is a rare appearance in contemporary life—a disinterested, articulable, and publicly affirmable idea of the good. Such a strong ontology is somewhat at odds with the cutting-edge institutions of the new capitalism, and with the educational regime that aims to supply those institutions with suitable workers—pliable generalists unfettered by any single set of skills.

Today, in our schools, the manual trades are given little honor. The egalitarian worry that has always attended tracking students into “college prep” and “vocational ed” is overlaid with another: the fear that acquiring a specific skill set means that one’s life is *determined*. In college, by contrast, many students don’t learn anything of particular application; college is the ticket to an *open* future. Craftsmanship entails learning to do one thing really well, while the ideal of the new economy is to be able to learn new things, celebrating potential rather than achievement. Somehow, every worker in the cutting-edge workplace is now supposed to act like an “intrapreneur,” that is, to be actively involved in the continuous redefinition of his own job. Shop class presents an image of stasis that runs directly counter to what Richard Sennett identifies as “a key element in the new economy’s idealized self: the capacity to surrender, to give up possession of an established reality.” This stance toward “established reality,” which can only be called psychedelic, is best not indulged around a table saw. It is dissatisfied with what Arendt calls the “reality and reliability” of the world. It is a strange sort of ideal, attractive only to a peculiar sort of self—gratuitous ontological insecurity is no fun for most people.

As Sennett argues, most people take pride in being good at something specific, which happens through the accumulation of experience. Yet the flitting disposition is pressed upon workers from above by the current generation of management revolutionaries, for whom the ethic of craftsmanship is actually something to be rooted out from the workforce. Craftsmanship means dwelling on a task for a long time and going deeply into it, because one wants to get it right. In management-speak, this is called being “ingrown.” The preferred role model is the management consultant, who swoops in and out, and whose very pride lies in his lack of particular expertise. Like the ideal consumer, the management consultant presents an image of soaring freedom, in light of which the manual trades appear cramped and paltry.(1,371 words)



### Construction Article #3

Use the LLCCC process on the following article.

Then, bring the article to English and Construction.

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

## The Cognitive Demands of Manual Work

In *The Mind at Work*, Mike Rose provides “cognitive biographies” of several trades, and depicts the learning process in a wood shop class. He writes that “our testaments to physical work are so often focused on the values such work exhibits rather than on the thought it requires. It is a subtle but pervasive omission.... It is as though in our cultural iconography we are given the muscled arm, sleeve rolled tight against biceps, but no thought bright behind the eye, no image that links hand and brain.”

Skilled manual labor entails a systematic encounter with the material world, precisely the kind of encounter that gives rise to natural science. From its earliest practice, craft knowledge has entailed knowledge of the “ways” of one’s materials—that is, knowledge of their nature, acquired through disciplined perception and a systematic approach to problems. And in fact, in areas of well-developed craft, technological developments typically preceded and gave rise to advances in scientific understanding, not vice versa. The steam engine is a good example. It was developed by mechanics who observed the relations between volume, pressure, and temperature. This at a time when theoretical scientists were tied to the caloric theory of heat, which later turned out to be a conceptual dead end. The success of the steam engine contributed to the development of what we now call classical thermodynamics. This history provides a nice illustration of a point made by Aristotle:

Lack of experience diminishes our power of taking a comprehensive view of the admitted facts. Hence those who dwell in intimate association with nature and its phenomena are more able to lay down principles such as to admit of a wide and coherent development; while those whom devotion to abstract discussions has rendered unobservant of facts are too ready to dogmatize on the basis of a few observations.

Another example is the Vernier scale used on machinists’ calipers and micrometers. Invented in 1631, it is a sort of mechanical calculus that renders continuous measurement in discrete digital approximation to four decimal places. Such inventions capture a reflective moment in which some skilled worker has made explicit the assumptions that are implicit in his manual skill.

In what has to be the best article ever published in an education journal, the cognitive scientists Mike Eisenberg and Ann Nishioka Eisenberg give real pedagogical force to this reflective moment, and draw out its theoretical implications (“Shop Class for the Next Millennium: Education Through Computer-Enriched Handicrafts,” in the *Journal of Interactive Media in Education*). They offer a computer program to facilitate making origami, or rather Archimedean solids, by unfolding these solids into two dimensions. But they then have their students actually make the solids, out of paper cut according to the computer’s instructions. “Computational tools for crafting are entities poised somewhere between the abstract, untouchable world of software objects and the homey constraints of human dexterity; they are therefore creative exercises in making conscious those aspects of craft work ... that are often more easily represented ‘in the hand’ than in language.” It is worth pausing to consider their efforts, as they have implications well beyond mathematics instruction.

In our early work with HyperGami, we often ran into situations in which the program provided us with a folding net that was mathematically correct—i.e., a technically correct unfolding of the desired solid—but otherwise disastrous. Figure 7 shows an example. Here, we are trying to create an approximation to a cone—a pyramid on a regular octagonal base. HyperGami provides us with a folding net that will, indeed, produce a pyramid; but typically, no paper crafter would come up with a net of this sort, since it is fiendishly hard to join together those eight tall triangles into a single vertex. In fact, this is an illustrative example of a more general idea—the difficulty of formalizing, in purely mathematical terms, what it means to produce a ‘realistic’ (and not merely technically correct) solution to an algorithmic problem derived from human practice.

I take their point to be that the crafting problem is in fact not reducible to an algorithmic problem. More precisely, any algorithmic solution to the crafting problem cannot itself be generated algorithmically, as it must include ad hoc constraints known only through practice, that is, through embodied manipulations. Those constraints cannot be arrived at deductively, starting from mathematical entities. It is worth noting in passing that this has implications for the theory of mind favored by artificial intelligence researchers, as it speaks to the “computability” of pragmatic cognition. It would be a task for cognitive science to determine if these considerations place a theoretical limit on the automation of work, but I can speak firsthand to how one area of work is resistant to algorithmic thinking.

Following graduate school in Chicago, I took a job in a Washington, D.C. think tank. I hated it, so I left and opened a motorcycle repair shop in Richmond. When I would come home from work, my wife would sniff at me and say “carbs” or “brakes,” corresponding to the various solvents used. Leaving a sensible trace, my day was at least imaginable to her. But while the filth and odors were apparent, the

amount of head-scratching I'd done since breakfast was not. Mike Rose writes that in the practice of surgery, "dichotomies such as concrete versus abstract and technique versus reflection break down in practice. The surgeon's judgment is simultaneously technical and deliberative, and that mix is the source of its power." This could be said of any manual skill that is diagnostic, including motorcycle repair. You come up with an imagined train of causes for manifest symptoms and judge their likelihood before tearing anything down. This imagining relies on a stock mental library, not of natural kinds or structures, like that of the surgeon, but rather the functional kinds of an internal combustion engine, their various interpretations by different manufacturers, and their proclivities for failure. You also develop a library of sounds and smells and feels. For example, the backfire of a too-lean fuel mixture is subtly different from an ignition backfire. If the motorcycle is thirty years old, from an obscure maker that went out of business twenty years ago, its proclivities are known mostly through lore. It would probably be impossible to do such work in isolation, without access to a collective historical memory; you have to be embedded in a community of mechanic-antiquarians. These relationships are maintained by telephone, in a network of reciprocal favors that spans the country. My most reliable source, Fred Cousins in Chicago, had such an encyclopedic knowledge of obscure European motorcycles that all I could offer him in exchange was regular shipments of obscure European beer.

There is always a risk of introducing new complications when working on decrepit machines, and this enters the diagnostic logic. Measured in likelihood of screw-ups, the cost is not identical for all avenues of inquiry when deciding which hypothesis to pursue. For example, the fasteners holding the engine covers on 1970s-era Hondas are Phillips-head, and they are *always* stripped and corroded. Do you *really* want to check the condition of the starter clutch, if each of ten screws will need to be drilled out and extracted, risking damage to the engine case? Such impediments can cloud one's thinking. Put more neutrally, the attractiveness of any hypothesis is determined in part by physical circumstances that have no logical connection to the diagnostic problem at hand, but a strong pragmatic bearing on it (kind of like origami). The factory service manuals tell you to be systematic in eliminating variables, but they never take such factors into account. So you have to develop your own decision tree for the particular circumstances. The problem is that at each node of this new tree, your own, unquantifiable risk aversion introduces ambiguity. There comes a point where you have to step back and get a larger gestalt. Have a cigarette and walk around the lift. Any mechanic will tell you that it is invaluable to have other mechanics around to test your reasoning against, especially if they have a different intellectual disposition.

My shop-mate Tommy Van Auken was an accomplished visual artist, and I was repeatedly struck by his ability to literally see things that escaped me. I had the conceit of a being an empiricist, but seeing things is not a simple matter. Even on the relatively primitive vintage bikes that were our specialty, some diagnostic situations contain so many variables, and symptoms can be so under-determining of

causes, that explicit analytical reasoning comes up short. What is required then is the kind of judgment that arises only from experience; hunches rather than rules. There was more thinking going on in the bike shop than in the think tank.

Socially, being the proprietor of a bike shop in a small city gave me a feeling I never had before. I felt I had a place in society. Whereas “think tank” is an answer that, at best, buys you a few seconds when someone asks what you do, while you try to figure out what it is that you in fact do, with “motorcycle mechanic” I got immediate recognition. I bartered services with machinists and metal fabricators, which has a very different feel than transactions with money, and further increased my sense of social embeddedness. There were three restaurants with cooks whose bikes I had restored, where unless I deceive myself I was treated as a sage benefactor. I felt pride before my wife when we would go out to dinner and be given preferential treatment, or simply a hearty greeting. There were group rides, and bike night every Tuesday at a certain bar. Sometimes one or two people would be wearing my shop’s T-shirt. It felt good.

Given the intrinsic richness of manual work, cognitively, socially, and in its broader psychic appeal, the question becomes why it has suffered such a devaluation in recent years as a component of education. The economic rationale so often offered, namely that manual work is somehow going to disappear, is questionable if not preposterous, so it is in the murky realm of culture that we must look to understand these things. To this end, perhaps we need to consider the origins of shop class, so that we can better understand its demise. (1,723 words)

#### Construction Article #4

Use the LLCCC process on the following article.

Then, bring the article to English and Construction.

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

### Arts, Crafts, and the Assembly Line

**A**t a time when Teddy Roosevelt preached the strenuous life and elites worried about their state of “over-civilized” spiritual decay, the project of getting back in touch with “real life” took various forms. One was romantic fantasy about the pre-modern craftsman. This was understandable given changes in the world of work at the turn of the century, a time when the bureaucratization of economic life was rapidly increasing the number of paper shufflers. The tangible elements of craft were appealing as an antidote to vague feelings of unreality, diminished autonomy, and a fragmented sense of self that were especially acute among the professional classes.

The Arts and Crafts movement thus fit easily with the new therapeutic ethic of self-regeneration. Depleted from his workweek in the corporate world, the office worker repaired to his basement workshop to putter about and tinker, refreshing himself for the following week. As T. J. Jackson Lears writes in his history of the Progressive era, *No Place of Grace*, “toward the end of the nineteenth century, many beneficiaries of modern culture began to feel they were its secret victims.” Various forms of antimodernism gained wide currency in the middle and upper classes, including the ethic of craftsmanship. Some Arts and Crafts enthusiasts conceived their task to be evangelizing good taste as embodied in the works of craft, as against machine-age vulgarity. Cultivating an appreciation for *objets d’art* was thus a form of protest against modernity, with a view to providing a livelihood to dissident craftsmen. But it dovetailed with, and gave a higher urgency to, the nascent culture of luxury consumption. As Lears tells the story, the great irony is that antimodernist sentiments of aesthetic revolt against the machine paved the way for certain unattractive features of late-modern culture: therapeutic self-absorption and the hankering after “authenticity,” precisely those psychic hooks now relied upon by advertisers. Such spiritualized, symbolic modes of craft practice and craft consumption represented a kind of compensation for, and therefore an accommodation to, new modes of routinized, bureaucratic work.

But not everyone worked in an office. Indeed, there was class conflict brewing, with unassimilated immigrants accumulating in America’s Eastern cities and serious labor violence in Chicago and elsewhere. To the upper classes of those same cities, enamored of the craft ideal, the possibility presented itself that the laboring classes might remain satisfied with their material lot if they found joy

in their labor. Shop class could serve to put the proper spin on manual work. Any work, it was posited, could be “artful” if done in the proper spirit; somehow a movement that had started with reverence for the craftsman now offered an apologetic for factory work. As Lears writes, “By shifting their attention from the conditions of labor to the laborer’s frame of mind, craft ideologues could acclaim the value of any work, however monotonous.”

The Smith-Hughes Act of 1917 gave federal funding for manual training in two forms: as part of general education and as a separate vocational program. The invention of modern shop class thus serviced both cultural reflexes of the Arts and Crafts movement at once. The children of the managerial class could take shop as enrichment to the college-prep curriculum, making a bird-feeder to hang outside mom’s kitchen window, while the children of laborers would be socialized into the work ethic appropriate to their station through what was now called “industrial arts” education. The need for such socialization was not simply a matter of assimilating immigrants from Southern and Eastern Europe who lacked a Protestant work ethic. It was recognized as a necessity for the broader working-class population, precisely because the institutions that had previously served this socializing function, apprenticeship and guild traditions, had been destroyed by new modes of labor. Writing in 1918, one Robert Hoxie worried thus:

It is evident ... that the native efficiency of the working class must suffer from the neglect of apprenticeship, if no other means of industrial education is forthcoming. Scientific managers, themselves, have complained bitterly of the poor and lawless material from which they must recruit their workers, compared with the efficient and self-respecting craftsmen who applied for employment twenty years ago.

Needless to say, “scientific managers” were concerned more with the “efficient” part of this formula than with the “self-respecting” part, yet the two are not independent. The quandary was how to make workers efficient and attentive, when their actual labor had been degraded by automation. The motivation previously supplied by the intrinsic satisfactions of manual work was to be replaced with ideology; industrial arts education now concerned itself with moral formation. Lears writes that “American craft publicists, by treating craftsmanship ... as an agent of socialization, abandoned [the] effort to revive pleasurable labor. Manual training meant specialized assembly line preparation for the lower classes and educational or recreational experiences for the bourgeoisie.”

Of the Smith-Hughes Act’s two rationales for shop class, vocational and general ed, only the latter emphasized the learning of aesthetic, mathematical, and physical principles through the manipulation of material things (Dewey’s “learning by doing”). It is not surprising,

then, that the act came four years after Henry Ford's innovation of the assembly line. The act's dual educational scheme mirrored the assembly line's severing of the cognitive aspects of manual work from its physical execution. Such a partition of thinking from doing has bequeathed us the dichotomy of "white collar" versus "blue collar," corresponding to mental versus manual. These seem to be the categories that inform the educational landscape even now, and this entails two big errors. First, it assumes that all blue collar work is as mindless as assembly line work, and second, that white collar work is still recognizably mental in character. Yet there is evidence to suggest that the new frontier of capitalism lies in doing to office work what was previously done to factory work: draining it of its cognitive elements. Paradoxically, educators who would steer students toward cognitively rich work options might do this best by rehabilitating the manual trades, based on a firmer grasp of what such work is really like. And would this not be in keeping with their democratic mission? Let them publicly honor those who gain real craft knowledge, the sort we all depend on every day. (1,040 words)

**Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Directions: LLCCC and bring to English and Engineering**

# Can Poor Spelling Derail a Career?

By **TODDI GUTNER**

*Q: I'm mentoring a young, ambitious engineer in our company. He's competent and demonstrates his energetic drive every day. However, he constantly makes spelling and grammatical errors in his writings. I've asked him to utilize spell-checking and re-read his emails. But mistakes such as confusing "our" with "are" and "there" and "their" aren't picked up with the computer tools. It's been over a year and he's still making these mistakes. What would you suggest as an appropriate next course of action? I am not sure if there are any additional classes he can take to improve his grammar/spell-checking skills.*

Spelling and grammatical errors indicate a lack of professionalism that can get in the way of your success.

**A:** While it is clear you have casually mentioned to your mentee about his spelling and grammatical errors, it sounds like it is time you have a more formal, direct discussion with him about his mistakes. It may be that he doesn't fully understand the gravity of the problem and the impact it can have on his career. "He needs to know that these mistakes are getting in the way of his success and that his lack of professionalism and inaccuracy is unacceptable," says Brad Karsh, president of JobBound, a career consulting firm.

To be sure, in this world of online communications, hastily written texts and emails filled with spelling and grammatical mistakes are easily accepted in an individual's personal world. But they are still unacceptable in the business world, says Beth N. Carvin, chief executive of Nobscot Corp., a human-resources consulting firm.

In your discussion, you'll want to stress the importance of being detail-oriented in written communication. "Tell him if he is serious about his ambitions, he can't risk being perceived by senior leaders as immature, illiterate or lacking attention to detail," says Ms. Carvin. It is possible his communications may end in the office of a C-suite executive who may not know he is great engineer. "The C-leader's impression may be immediately (and permanently) soured," she says.

When you open up the conversation, "ask him if his manager has mentioned the spelling and grammatical mistakes to him, and whether it's impacting his performance," says Rabia de Lande Long, consultant and executive coach at Chartwell Advisors. If your mentee doesn't know, ask him if he would like you to discuss this issue with his boss to find out. If it turns out that it is a problem, then your mentee might be more motivated to improve his work.



Once you've established the importance of well-written and accurate communications, you'll need to lay out strategies for him to follow. One suggestion is for him to print out all important communications before he sends them. He should slowly proofread them and make corrections on the paper copy. He can also ask a peer or teammate to double-check his work, says Ms. de Lande Long.

Ms. Carvin suggests two books to help with spelling and grammar rules: "The Art of Spelling: The Madness and the Method" by Marilyn vos Savant and Strunk and White's "The Elements of Style." Another option is to enroll him in a nearby community college or continuing-education grammar course. This will give him a chance to improve and perfect his skills, says Mr. Karsh.

Be aware, however, that your mentee may share that he has a learning disability, like dyslexia. If he chooses to share his diagnosis with the company, then he has the right to ask for a reasonable accommodation from the company. Learning disabilities like dyslexia are considered an impairment for American Disability Act purposes. "Unless the company can show that reasonable accommodation would cause undue hardship on the operation of its business, it will engage in an 'interactive' process with the engineer to establish a reasonable accommodation," says Ms. de Lande Long. For example, the company might offer him more time to prepare his work and establish a quiet location to aid concentration, she says.

Whether your mentee's grammatical and spelling issues are the result of hasty work processes or a learning disability, he is lucky to have someone who has taken the time to notice a potential career derailer and work with him.

## INNOVATION &amp; TECHNOLOGY

# AT&T's Wireless Ambitions

With growth slowing, it's looking to turn mobile access to the Net into a multibillion-dollar business

By Roger O. Crockett

In one wing of AT&T's sprawling corporate campus just outside Atlanta's upscale Buckhead neighborhood, a cadre of wireless employees is doing business in a way that's anything but usual for the telecom behemoth. The newly assembled team, led by about a dozen executives, operates more like a startup than a part of the 132-year-old AT&T. And with good reason: Their mission is to come up with innovative ways for people to use AT&T's wire-

less network. The idea is to go beyond cell phones and hook up all manner of electronics to the Internet—from digital cameras and navigation devices to parking meters—to change the way people live and work.

Despite the unusual operating arrangement, AT&T CEO Randall L. Stephenson says this is no sideline for his company. He believes that figuring out how to take advantage of mobile access to the Internet will be critical to AT&T's growth. "It is the strategic

initiative. It is the business model," says Stephenson in an interview. "It supports everything we're going to be doing over the next five to 10 years."

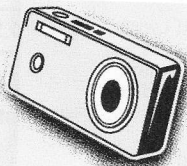
## WORKING WITH PARTNERS

The Atlanta team, officially called the Emerging Devices group, is led by Glenn Lurie, a 43-year-old industry veteran who earned his stripes managing AT&T's iPhone partnership with Apple. Stephenson has backed up his high expectations by giving Lurie wide latitude in testing ideas and arranging additional partnerships. What he wants in return is for the team to help AT&T gain share in what by 2013 is forecast to be a \$93 billion market for linking gadgets to wireless networks.

AT&T executives won't disclose exactly what kinds of devices they will offer next. But people familiar with the company's plans say one product on the way later this year is an electronic book reader, similar to Amazon.com's Kindle. AT&T could partner with companies that make rival e-books, such as Sony or startup Plastic Logic. Also in the works is a portable navigation device that lets motorists use AT&T's network to collect real-time traffic data. And there's a gadget that

## BEYOND CELL PHONES

AT&T and other carriers are betting consumers and businesses will want to use wireless networks to connect a host of gadgets to the Internet.



### DIGITAL CAMERAS

AT&T plans to sell cameras with wireless technology so users can post photos to the Net from almost anywhere



### ELECTRONIC BOOK READERS

Devices similar to Amazon's Kindle will surf the Net and manage work documents



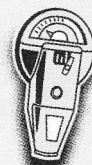
### NAVIGATION DEVICES

By yearend, AT&T may sell GPS devices that get real-time traffic info off the Net



### GAMING CONSOLES

Gamers could use the wireless network to play anywhere there's a big screen



### PARKING METERS

Hookups to the wireless network will let cities check meters from the office



lets drivers alert others to speed traps with the press of a button. AT&T is working with manufacturers to develop the products. As it does with the iPhone, the company plans to sell the devices through its own stores and may share wireless service revenues with manufacturers. "We have to break the rules," says Lurie.

In the future, AT&T plans to offer more advanced gadgets: digital cameras that link to the Net for sharing and printing photos; tools that help city agencies monitor parking meters from afar; and devices that alert businesses when they need to replace candy or soda in vending machines. "In three to four years it's not inconceivable a user may have four to five devices hooked onto a wireless plan," says mobile consultant Chetan Sharma.

Stephenson, 49, can't afford to stick with the status quo. A native Oklahoman who began in the IT department of Southwestern Bell 27 years ago, Stephenson succeeded Edward E. Whitacre Jr. as CEO in 2007. Whitacre, who was just tapped as outside chairman of General Motors, transformed Southwestern Bell into the new AT&T with a series of blockbuster acquisi-

tions totaling more than \$200 billion. But with no major targets left, the days of cutting megadeals to grow are over.

What's more, AT&T's own growth is slowing. The traditional wired phone service is shrinking by about 10% a year, and wireless growth has slipped enough that it may no longer make up the difference. Analysts expect sales to drop by \$1 billion this year from \$124 billion in 2008. Next year, AT&T may lose the exclusive right to sell the iPhone for Apple in the U.S., which has helped lure millions of new subscribers.

#### RIVAL STRATEGIES

Stephenson is betting he can turn the tide with new wireless gadgets. Already, AT&T is selling inexpensive portable computers called netbooks, and the CEO thinks that could soon be a \$1 billion business. Lurie believes his team can pull in another \$1 billion from other wireless-connected devices over the next few years. "If you get a few billion-dollar businesses I'd say you're doing pretty good," says Stephenson.

But how much difference will this make for AT&T? It will take time to persuade customers to consider buying computers and cameras from the

telecom giant, instead of, say, Best Buy. Even if AT&T adds \$2 billion in new revenues over the next three years, that's less than 2% of the total. It may not be enough to get AT&T back to positive revenue growth, given the declines in its other businesses. "It's hard to find things to move the needle for a company as large as AT&T," says John Hodulik, an analyst at UBS.

At the same time, AT&T's rivals are pursuing similar avenues of growth. Verizon Wireless is already selling inexpensive netbooks in more regions than AT&T. In addition, Verizon's network often ranks higher than AT&T's in surveys measuring reliability. "This is a game of catch-up on [AT&T's] part," says a Verizon spokesman.

For his part, Stephenson took an unprecedented step when he signed off on the iPhone partnership that gave Apple a slice of the monthly service revenues from each device. Now he plans to break more new ground with the next generation of wireless devices. "Mobile broadband is where the growth is going to come from," he says. "And we don't think we are even scratching the surface yet." | BW |

—With Olga Kharif